

**CLOSED
CITY OF HELENA LANDFILL
LICENSE NUMBER 90**

HYDROMETRICS

**GROUNDWATER MONITORING DATA, FALL
1992**

APRIL 1993

**IS LOCATED IN THE GROUNDWATER
MONITORING REPORTS ARCHIVE,
BOX NUMBER 3**

RECEIVED 4/29/1993



November 11, 1992

Ms. Pat Potts
Montana Department of Health and
Environmental Sciences - Solid Waste Bureau
Cogswell Building
Capitol Station
Helena, MT 59620

RECEIVED

NOV 13 1992

MONTANA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL SCIENCES
SOLID AND HAZARDOUS WASTE BUREAU

RE: Helena Landfill NOD letter

Dear Ms. Potts

Enclosed are responses to your Notice of Deficiencies (NOD) letter concerning the "Helena Landfill 1992 Annual Report on Groundwater Monitoring." Revised pages and additional information which you requested have been provided on blue paper and are 3-hole punched for your convenience. Revised Exhibits 1 and 2 are also included.

Please call if you have any questions.

Sincerely,

Steven K. Downs
Geological Engineer/Hydrogeologist

SD

Enclosure

cc: Dick Nisbet - City of Helena

RESPONSES TO MDHES NOTICE OF DEFICIENCIES LETTER ON HELENA LANDFILL GROUNDWATER AND METHANE MONITORING REPORT

COMMENT 1) Page 5.

In the Annual Report, it is stated that wells are purged with a decontaminated truck mounted bailer or disposal hand-bailer. Explain why a submersible pump was used to purge and take all but VOA samples during the May, 1992 sampling event at well 83-6. Does this procedure need to be revised in the text to exemplify actual field operations?

Please provide the order in which the wells are sampled. Provide the order in which the samples are collected from each well.

RESPONSE:

Page 5 has been revised to reflect that a stainless steel submersible pump may also be used to purge the wells and take all of the samples except for the VOA samples. The May 1992 sampling round is the only time the submersible has been used, and the wells are typically purged by bailing.

The blank analyses provide documentation that the decontamination procedure is adequate to ensure that samples are not cross-contaminated. The monitoring wells will be sampled in the following order.

1. Monitoring Well 83-6
2. Monitoring Well HL90-3
3. Monitoring Well HL90-1
4. Monitoring Well HL90-2
5. Monitoring Well EPA-1 (This well is purged with a disposable bailer)

Samples are typically collected in the following order; metals, nutrients, common ions, cyanide, and volatile organics.

COMMENT 2) Page 7.

In the analysis of the plume described in this document as:

"the plume of organic constituents" that "has not significantly changed";

a plume map of only dichlorodifluoromethane was presented. Explain how the area and concentrations of this plume compare

COMMENT 2 Page 2

In the Annual Report it is stated that wells are purged with a
disinfectant that contains either or hypochlorite solution.
Further, a disinfectant pump was used to purge and fill all
but VOA samples during the first 1992 sampling event in well 83-
1. Thus this procedure needs to be revised in the next to thoroughly
detail this operation.

Please provide the order in which the wells are purged. Provide
the order in which the samples are collected from each well.

REPLY:

Page 2 has been revised to reflect that a disinfectant pump may also be
used to purge the wells and also fill in the sample vials for the VOA samples. The
1992 sampling event is the only time the disinfectant has been used, and the wells
are generally purged by hand.

The blank analysis provides documentation that the disinfection procedure is
adequate to ensure that samples are not cross-contaminated. The monitoring wells will
be purged in the following order:

1. Monitoring Well 83-6
2. Monitoring Well HI-90-1
3. Monitoring Well HI-90-1
4. Monitoring Well HI-90-2
5. Monitoring Well EPA-1 (This well is purged with a
disinfectant pump)

Samples are typically collected in the following order: metals, nutrients, organic ions,
organics, and volatile organics.

COMMENT 2 Page 2

In the analysis of the phone described in this document as

"the phone of organic compounds" that has not
significantly changed.

A phone may be only slightly contaminated, was purchased
during the same time and concentration of the phone company.

with the plumes associated with the other organic constituents associated with the impacted groundwater in the area of the site. Provide additional constituent isopach maps to depict the areal extent of contamination and the constituent concentrations, or if no changes have been observed, equilibrium conditions.

RESPONSE:

Dichlorodifluoromethane was used to represent the plume of organic constituents due to its high mobility in groundwater as described in the text. This parameter was chosen because it provided a conservative estimate of the extent of all of the organic constituents detected in the groundwater. This approach is typical of hydrogeologic characterization of organic plumes. For example, gasoline constituent plumes are often represented by benzene because benzene is very mobile and conservatively represents all of the gasoline constituents expected to be present. The preparation of further isopach maps for other compounds would be costly and time-consuming and would provide limited further information.

COMMENT 3) Table 3.1 "Typical Uses and Properties of Those Organic Compounds Detected in Groundwater".

Please identify the degradation products associated with the organic compounds listed in this table.

RESPONSE:

According to the NTIS' "Water-Related Environmental Fate of 129 Priority Pollutants, Volume II" prepared in 1979 for the EPA, the following common degradation products have been identified for each of the seven organic constituents identified in Table 3.1:

CONSTITUENT

1,1 Dichloroethane

Tetrachloroethene

1,1,1 Trichloroethane

Trichloroethene

DEGRADATION PRODUCT

Chloroacetylchloride

Trichloroacetylchloride,
Chlorinated Acetic Acids,
Phosgene, Hydrochloric Acid,
and Hydrogen Chloride

Trichloroacetaldehyde,
Trichloroacetic acid

Dichloroacetyl chloride,

with the plants associated with the river, organic materials
associated with the organic materials in the soil of the site.
Further additional comments would have to be made on the
nature of the materials and the associated materials, as the
changes have been observed, significant changes.

REMARKS

Environmental monitoring was used to measure the degree of organic materials in
the high mobility in groundwater as described in the text. This parameter was chosen
because it provided a comprehensive picture of the extent of all of the organic
materials in the groundwater. This system is a type of hydrologic
monitoring of organic materials. For example, groundwater monitoring is often
conducted by means of organic materials in very small and relatively narrow
all of the organic materials reported in the text. The purpose of this
system was to show that the organic materials were not moving and would
provide limited future information.

COMMENT: It is noted that the typical data and figures of these Organic Chemicals
are in the text.
Please clarify the organic materials mentioned with the organic
materials listed in the text.

REMARKS

According to the 1972 "Water Quality Criteria" Table of 123 Organic Chemicals,
Volume 1, the 1972 Table of 123 Organic Chemicals, the 1972 Table of 123 Organic Chemicals
have been identified for each of the organic materials identified in Table 1.

ENVIRONMENTAL MONITORING
Environmental Monitoring

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	Phosgene	hydrogen chloride
Chloroform	Phosgene and ClO radicals	
Dichlorodifluoromethane	Carbonyl flouride, Chlorine	
Trichloroflouromethane	Chlorine	

Volatilization appears to be the major transport process for these pollutants, however several other physical and geochemical processes may influence the environmental fate of these constituents. These processes include photolysis, hydrolysis, oxidation, sorption, bioaccumulation, biodegradation and biotransformation. Many of the degradation products listed above subsequently degrade (often very quickly) by hydrolysis to hydrochloric acid, carbon monoxide, carbon dioxide, and chlorine atoms.

COMMENT 4) Table 3.2 "Volatile Organic Compound Levels in Private Wells Near Helena Landfill".

Provide a table giving the highest concentrations of any contaminant constituents found in the monitoring wells.

RESPONSE:

All of the analytical data from samples collected in the past year are tabularized on a site-by-site basis for the MDHES' convenience in Appendix 3 of the report. A quick review of this table will provide the information requested. Data from private well samples was presented in Table 3.2 because the City of Helena is very concerned about any potential impacts to private wells from the landfill.

COMMENT 5) Page 10.

Identify the wells that are across gradient or upgradient to the west of the landfill that have exhibited detectable amounts of trichloroethene and chloroform. How have the concentrations of these constituents changed through the period of time that the landfill has been monitoring groundwater?

RESPONSE:

Page 10 refers to upgradient and across gradient wells that have exhibited detectable levels of tetrachloroethene and chloroform rather than trichloroethene. The 1990 report

referenced in this report identifies these wells as private wells 24, 28 and 34 on Exhibit 1. Samples from upgradient monitoring well 83-6 also contained detectable amounts of trichloroethane during both sample events discussed in the report.

COMMENT 6) Page 11, Methane Monitoring.

(a) Please provide details, such as a manufacturer's brochure, or the portion of the instrument operations manual discussing the use of the "inject" mode on the OVA for measuring a **"direct methane concentration reading"**.

(b) Why isn't the Gastech Environmental Monitors Tank-Techtor instrument being used for methane monitoring, as Hydrometrics had proposed in their letter to the Department dated June 26, 1991?

(c) On June 4, 1991 the City of Helena's Fire Department detected 100% LELs in two of the landfill monitoring wells (i.e. 82-3 and 83-7). Why isn't well 83-7 presently being monitored for methane gas?

(d) After removing the well cap and covering the open wellhead with aluminum foil, how long did you wait to allow stabilization of the gases to occur in the well casing. Because methane is a naturally occurring, heavier than air gas, what type of well-evacuation method was used to sample gases from the bottom portion of the casing.

(e) Discuss the procedures and equipment used in the collection of methane samples for laboratory analysis.

(f) Provide the numerical equivalent(s) for "background levels" in reference to methane monitoring associated with this methodology and technology.

(g) Provide the conversion factor(s) for parts-per-million (ppm) methane, to percent lower explosive limits (LELs).

(h) Note that methane monitoring from groundwater monitoring wells is not an acceptable procedure for accurate methane gas measurement. Therefore, it is important that the City of Helena be cognizant of the fact that an approved methane monitoring system is presently required at this facility, and will be required at all Class II landfills as of October, 1993 [see 40 CFR 258.23(a)].

RESPONSE:

- a) The use of the inject mode for methane detection was detailed to Hydrometrics in personal communications with Mr. Bill Hill of Hilltech, Inc. in Albuquerque, NM ((505) 268-1733). Mr. Hill is Foxboro's technical representative for this area. If the Foxboro 128 is equipped with a gas chromatograph mode (as is Hydrometrics), the inject sample button causes the pumped air to be pushed through a carbon filter. This filter retains heavy gasses and methane can be detected directly. It should be noted that the City of Helena Fire Department has taken over the methane monitoring at the site, so the OVA 128 GC is not presently being used to monitor methane.
- b) The Foxboro OVA 28 GC instrument has been used because this instrument is calibrated specifically to methane and provides direct read data unlike the Gastech instrument. The Helena Landfill Closure Plan which was submitted to the MDHES in September of 1991 postdates the June 26 letter and specifies that either of the instruments may be used. The MDHES did not comment on this protocol in their review of the Closure Plan.
- c) Monitoring well 83-7 is on the present methane monitoring network and the results for this well were inadvertently left out of Table 4.1. A revised Table 4.1 is enclosed.
- d) The tinfoil was placed on the wellhead in a manner to prevent the escape of vapors as much as possible. Readings were taken approximately 5 to 10 minutes after the tinfoil was placed. Methane is a lighter than air gas (Hawley's Condensed Chemical Dictionary, Sax and Lewis, 1987) and it is not necessary to purge from the bottom of the casing because the methane will rise to the top of the casing.
- e) The samples collected for laboratory analysis were taken in a similar manner as the vapor concentrations were measured. However, a personal air sample was used to pump the sample into a gas sampling bag instead of a monitor being used to extract the sample. Samples were shipped to Energy Laboratories in Billings for analysis. The samples were extracted immediately after monitoring the vapor concentration with the organic vapor analyzer.
- f) According to Hawley's Condensed Chemical Dictionary (Sax and Lewis, 1987) dry air at sea level contains a background methane concentration of around 2 parts per million. Hydrometrics' OVA instrument used for the methane monitoring discussed in the report typically gives a background reading of organic vapors in ambient air of around 3 to 6 parts per million. This reading is of all organic constituents detected at background levels in the Helena area.
- g) The lower explosive limit (LEL) for methane is 50,000 parts per minute (CHRIS manual). To convert from ppm to %LEL the ppm number should be divided by 500.
- h) The November 21, 1991 letter from MDHES to the City of Helena indicated that dedicated gas monitoring wells were "strongly recommended" however, the MDHES has

not required the probes to this date. The City of Helena is currently revising the closure plan for resubmittal to the state. The revised closure plan will include a methane monitoring plan which includes dedicated methane monitoring probes around the periphery of the landfill. This plan will be submitted to the state for approval.

COMMENT 7) Table 4.1 "1992 Methane Monitoring at the Helena Landfill".

a) With the continually elevated methane concentrations measured at groundwater monitoring well 82-3, additional methane monitoring points such as I-6 would be helpful in possibly delineating and tracking the extent of the existing methane plume. Is it mechanically possible to monitor headspace for methane gas at well I-6?

b) Please provide a map to depict the areas of high methane gas concentrations.

RESPONSE:

a) Because of the irrigation plumbing on well I-6, methane readings are not feasible at this time. Dedicated methane monitoring probes will more adequately address this area when they are installed.

b) Monitoring well 82-3 is the only area where "high" methane gas concentrations are typical. After the methane monitoring probes are installed, more data may be available to depict the migration of methane at the site.

COMMENT 8) Page 14 - conclusions

a) Although this report states that:

"no significant changes from the previous monitoring event in groundwater flow directions or water quality has occurred",

(i) Describe what is a "significant" change.

(ii) Are there any seasonal changes, either potentiometric or constituent concentrations, that can be noted over the previous years of groundwater monitoring history.

b) Explain how "equilibrium conditions" can be reached, if the landfill is still actively taking wastes and no remedial measures have been initiated.

RESPONSE:

a) The report states that no significant changes in groundwater flow directions or water quality because flow directions and the size of the plume of organic constituents has changed very little over the last several sampling episodes. This is evident when comparing the potentiometric and plume maps in the last two reports on groundwater monitoring submitted to the MDHES. This is a general observation and not based on a statistical evaluation of the data. No obvious seasonal changes in groundwater flow direction has been observed. The organic constituent concentrations are typically slightly lower in samples taken during the spring monitoring event, most likely due to dilution due to the higher water levels in the spring.

b) Page 14 does not indicate that equilibrium conditions have been obtained at the Helena Landfill. The amount of leachate produced by the landfill is more related to the amount of precipitation than the volume of garbage the landfill contains, therefore the volume of leachate produced by the landfill remains relatively constant. Geochemical and biological processes occur in the aquifer to attenuate or remove the contaminants from the water as it moves through the aquifer materials. These processes include biological degradation, adsorption and other geochemical processes. The capability of the aquifer to remove the contaminants increases as the plume broadens because more adsorption sites and biological material become available. When the attenuation capability expands to the same rate as the contaminants (leachate) are added to the system, then equilibrium (as referred to in the report) is achieved. Dilution and dispersion of the contaminants also are factors that decrease the concentrations of the constituents as the plume expands. When the constituents are diluted and/or dispersed to levels below current analytical method detection limits, then the migration of the plume will not be evident.

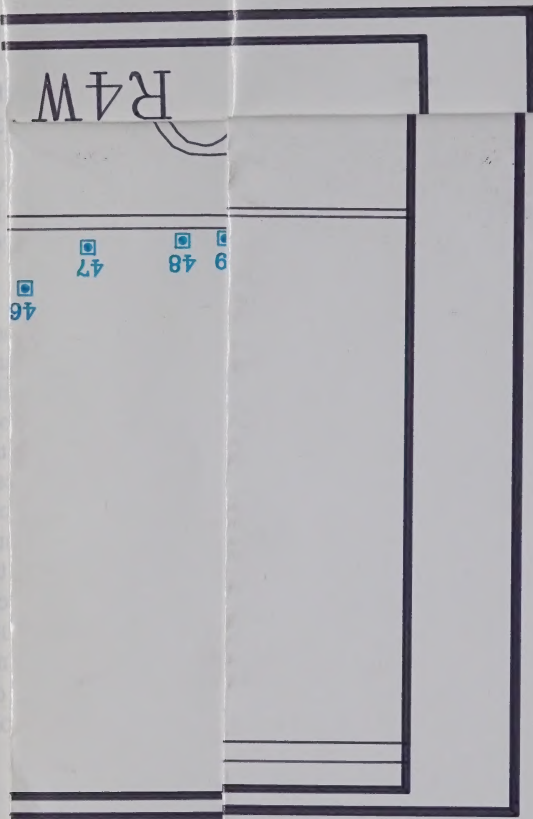
COMMENT 9) Figure 1 - Potentiometric Map

a) Provide the water level elevations on the map at the data points measured.

b) Is the infiltration gallery part of the landfill groundwater system? Explain the purpose and use of this gallery.

c) Why are there two locations on this map for abandoned monitoring well HL-4?

d) Please correct the Township on the base map for both Figures 1 & 2.



Infiltration Gallery



Potentiometric Contour (May, 1992)
(Dashed Where Inferred)



Approx. Location Of Storm Drain



Approx. Extent Of City Of Helena Landfill

RESPONSE:

- a) Potentiometric data are provided in Appendix 3 and the data are included on the revised Exhibit 1.
- b) Potentiometric data provided on Exhibit 2 indicate that the infiltration gallery is not part of the landfill groundwater system. The gallery is used as a water supply source for the Bill Roberts Municipal Golf Course.
- c) Both Exhibits have been revised to show abandoned well HL-9 which was inadvertently labeled HL-4.
- d) The Township has been corrected on both Exhibits to T10N.

COMMENT 10) Appendix 1 - "Helena Landfill Area Well Inventory"

Where is monitoring well 83-6 on this inventory?

RESPONSE:

Monitoring Well 83-6 has been added to the inventory.

COMMENT 11) Appendix 2 - "Laboratory Analytical Reports"

- a) Please provide a "Sample Code List" for the 5-92 analytical data, as you have for the 1-92 data.
- b) Why were numbers HL-9205-104, 111, 120, and 121 omitted in the sample collection numbering system?
- c) Provide copies of the chain of custody (COC) forms.

RESPONSE:

- a) The sample location has been denoted on the individual analytical reports, so a sample code list is unnecessary, however one has been provided for the MDHES' convenience.
- b) Hydrometrics uses a computerized random number generator to develop its sample codes. Therefore numbers are not always sequential in a sampling round.
- c) Copies of the chain of custody forms for the two sample events are included.



R4W

R3W

RESPONSE:

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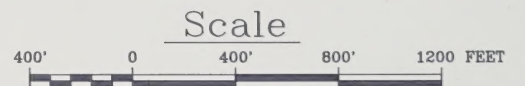
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Legend

- HL-2 ■ Piezometer
- 83-5 ○ Abandoned Monitoring Well
- 83-6 ● Monitoring Well
- I-6 ▲ Irrigation Well
- 80 ■ Domestic Well
- ▨ Infiltration Gallery
- 3950 — Potentiometric Contour (May, 1992)
(Dashed Where Inferred)
- - - - - Approx. Location Of Storm Drain
- ▭ Approx. Extent Of City Of Helena Landfill



Project:
City of Helena Landfill

Sheet Title:
Domestic and Monitoring Well
Locations and Potentiometric
Contour Map for May, 1992

Hydrometrics, Inc.
Consulting Scientists and Engineers
2727 Airport Road
Helena, Montana 59601
(406) 443-4150

Drawn: GLP, JHD
Checked: SD
Approved: MW
Date: 7/20/92
Rev. 11/01/92

EXHIBIT
1
HLF2392F

quality control samples were obtained for each event to ensure that laboratory and field performances were adequate.

Sampling of monitoring and private wells was done as per Hydrometrics' standard operating procedures. These procedures are in compliance with present professional standards and are designed to obtain data that are statistically valid and representative of field conditions. A brief description of sampling procedures follows.

Water levels were taken from all monitoring wells prior to sampling activities. Water levels were recorded in the project field book as well as on Hydrometrics' groundwater sampling forms. The volume of water present in the well bore water was then calculated. At least three bore volumes of water were evacuated from the well with a decontaminated truck mounted bailer, a disposable hand bailer or a stainless steel submersible pump. After purging, pH and SC measurements were taken with portable instruments. All VOC samples were collected with a pre-cleaned disposable hand bailer. Samples were then properly preserved as per EPA methodology, and immediately refrigerated in a cooler. Private well sampling followed similar methodology, however, the wells' submersible pumps were used to purge and sample the wells. Water levels were not taken in private wells due to the difficulty in access because of pump wires and drop pipes.

All samples were kept refrigerated until they were shipped (on ice) to Energy Laboratories in Billings for analysis. The samples were shipped with EPA type chain-of-custody documentation.

TABLE 4.1. 1992 METHANE MONITORING AT THE HELENA LANDFILL

<u>Site Name</u>	<u>April 6, 1992 Concentration (ppm)</u>	<u>June 10, 1992 Concentration (ppm)</u>
MPC Office	4.0	3.0
YMCA Bsmt.	130	20
Armory	3.6	4.1
Elk River	3.4	3.5
Landfill Offc.	3.1	2.8
82-3	470	320
HL-90-3	3.0	3.6
HL-90-2	4.0	3.0
HL-90-1	3.1	2.6
82-2	3.3	3.2
EPA-1	3.1	3.0
HLP91-1	4.0	4.2
HL-1	3.1	3.9
HL-7	3.1	8.2
I-5	3.3	3.4
EPA-2	3.6	17
83-7	3.1	6.0

NOTE: Site locations are shown on Exhibit 1.

HELENA LANDFILL

Sample Code List

<u>SITE CODE</u>	<u>SAMPLE NUMBER</u>
# 13	HL-9205-105
# 40	HL-9205-118
# 48	HL-9205-121
# 52	HL-9205-114
✓ # 59	HL-9205-102
✓ # 75	HL-9205-100
83-6	HL-9205-103
Rinsate Blank	HL-9205-107
EPA-1	HL-9205-123
HL-90-1	HL-9205-122
✓ HL-90-2	HL-9205-101
HL-90-3	HL-9205-109
HL-90-2(Duplicate)	HL-9205-119

? #31

110 ? → #48

→ 112 ?

CHAIN OF CUSTODY RECORD

PROJ. NO.		PROJECT NAME				NO. OF CON- TAINERS	Commons C.N Nutrients Diss Metals Vol's					REMARKS
SAMPLERS: (Signature) <i>Steve Downs For Mike Scott</i>												
STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION							
	5-19-92	1030		X	HL-9205-109							
2	5-19-92	1240		X	HL-9205-122	6	X	X	X	X	X	"
3	5-19-92	1400		X	HL-9205-107	6	X	X	X	X	X	"
4	5-19-92	1500		X	HL-9205-101	6	X	X	X	X	X	"
5	5-19-92	1330		X	HL-9205-119	6	X	X	X	X	X	"
6	5-19-92	1630		X	HL-9205-103	6	X	X	X	X	X	"
7	5-20-92	1330		X	HL-9205-123	2					X	"
8	5-20-92	0930		X	HL-9205-105	2					X	"
9	5-20-92	1020		X	HL-9205-102	2					X	"
10	5-20-92	1045		X	HL-9205-100	2					X	"
11	5-20-92	1130		X	HL-9205-110	2					X	"
												Please send results attention Steve Downs, Hydrometrics.
Relinquished (Signature)		Date/Time		Received by: (Signature)		Relinquished by: (Signature)		Date/Time		Received by: (Signature)		
<i>Mike Scott</i>		5-22-92 1030										
Relinquished (Signature)		Date/Time		Received by: (Signature)		Relinquished by: (Signature)		Date/Time		Received by: (Signature)		
Relinquished (Signature)		Date/Time		Received for Laboratory by: (Signature)		Date/Time		Remarks				
				<i>[Signature]</i>		5/23 10:00 AM						

2727 Airport Road • Helena, Montana 59601 • (406) 443-4150

[illegible]

Hydrometrics Inc.



CHAIN OF CUSTODY RECORD

2727 Airport Road • Helena, Montana 59601 • (406) 443-4150

PROJ. NO.		PROJECT NAME				NO. OF CON- TAINERS	REMARKS						
SAMPLERS: (Signature)							Common's Nutrients CN Dissolved Metals EPA-8240						
STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION								
	1-21-92	1400		X	HL-9201-100	6	X	X	X	X	X	SSS PARAMETERS LIST	
	1-21-92	1500		Y	HL-9201-101	6	X	X	X	X	X		
	1-22-92	0830		X	HL-9201-102	6	X	X	X	X	X		
	1-22-92	0945		X	HL-9201-103	2					X		
	1-22-92	1130		X	HL-9201-104	6	X	X	X	X	X		
	1-22-92	1140		X	HL-9201-105	2					X		
	1-22-92	1305		X	HL-9201-106	2					X		
	1-22-92	1350		Y	HL-9201-107	2					X		
	1-22-92	1415		X	HL-9201-108	2					X		
	1-22-92	1430		Y	HL-9201-109	2					X		
Relinquished (Signature)						Date/Time		Received by: (Signature)		Date/Time		Received by: (Signature)	
Relinquished (Signature)						Date/Time		Received by: (Signature)		Date/Time		Received by: (Signature)	
Relinquished (Signature)						Date/Time		Received for Laboratory by: (Signature)		Date/Time		Remarks	

Split Samples:
☐ Accepted ☐ Declined

Sign: _____

2727 Airport Road • Helena, Montana 59601 • (406) 443-4150

CHAIN OF CUSTODY RECORD

[illegible]

APPENDIX 1: HELENA LANDFILL AREA WELL INVENTORY

NUMBER	ADDRESS	OWNER	DEPTH	PERFORATED ZONE
1	230 Meadow Dr.	G. Amestoy	100	---
2	233 Meadow Dr.	C. Colarchic	---	---
3	227 Greenwood	A. Holzwarth	---	44-64
4	5 Deborah Ct.	T. Johnson	100	---
5	350 Custer Ave.	S. Colvin	80	60-80
6	3119 Bridger	J. Garman	100	70-100
7	454 Vigilante	R. Stenquist	51	---
8	3107 Vigilante	C. Knutson	101	80-100
9	3130 Vigilante	C. Tielking	61	---
10	448 Russell	L. Peterman	---	---
11	472 Russell	J. Zimmerman	---	---
12	448 Paxon	M. Parriman	68	60-68
13	102 Oakwood	E. Johnson	118	78-118
14	104 Oakwood	K. Rogers	115	70-110
15	106 Oakwood	E. Darfler	140	90-140
16	3 Parr Court	C. Tilzey	65	54-64
17	105 Wedgewood	F. Robinson	---	---
18	108 Wedgewood	B. Hartman	---	---
19	119 Wedgewood	D. Clark	115	90-115
20	3 Terry Court	H. Peterson	120	80-120
21	146 Briarwood	R. Karp	52	12-52
22	154 Briarwood	R. Burger	---	---
23	114 Ridgewood	T. Berry	75	55-75
24	1130 Waukesha	E. Johnson	180	100-180
25	1703 Waukesha	M. Carmichael	---	---
26	932 Peosta	G. Daly	300	---
27	1110 Peosta	S. McCann	360	---
28	1314 Peosta	M. Johnson	278	170-270
29	1331 Peosta	R. Guse	300	120-290
30	1611 Peosta	R. Brohman	135	---
31	1430 Brady	D. Gardner	101	75-95
32	1815 Brady	W. Routzahn	220	140-220
33	1317 Hudson	C. Engstedt	---	---
34	1325 Hudson	K. Erickson	118	78-118
35	1427 Broadwater Cir.	Broadwater Vill.	215	95-215
36	3203 Cooney	Kalamity Bros.	45	38-45

--- Denotes information not found. Inventory is based on DNRC records and field investigation.

APPENDIX 1: HELENA LANDFILL AREA WELL INVENTORY

37	235 Anderson Blvd.	G. South	100	40-100
38	227 Anderson Blvd.	T. Tillo	100	40-100
39	239 Anderson Blvd.	W. Kotan	82	58-82
40	2509 Teakwood	E. Hartman	70	50-70
41	124 Meadow	Strasko	73	53-73
42	112 Meadow	W. Hill	72	52-72
43	246 Brady	Frisch	80	40-80
44	1023 Peosta	Cumley	65	55-65
45	94 Oakwood	Hanson	116	---
46	320 Custer	Colvin	---	---
47	328 Custer	Robinson	---	---
48	308 Custer	C.A. Barbeau	79	---
49	304 Custer	---	---	---
50	226 Custer	---	---	---
51	220 Custer	E. Hartze	64	---
52	Custer & Grn. Meadow	---	---	---
53	121 Dunbar	G. Kercher	---	---
54	122 Dunbar	S. Hitchcock	67	57-67
55	114 Dunbar	---	---	---
56	112 Dunbar	G. Francis	54	---
57	108 Dunbar	Bacon	---	---
58	106 Dunbar	---	---	---
59	100,102 Dunbar	Stolp	---	---
60	No Address - Trailers	---	---	---
61	78 Dunbar	J. Hayes	72	---
62	76 Dunbar	J. Bridges	80	60-80
63	110 Willow	G. Milairn	---	---
64	121 Willow	B. Bonogofsky	82	58-82
65	110 Willow	Pool	85	---
66	108 Willow	---	---	---
67	105 Willow	O'Neal	100	60-100
68	104 Willow	J. Creach	80-100	---
69	19 Willow	Horsecienda Hotel	---	---
70	11 Willow	Gardner	55	---
71	3204 Mitchell	Chamberlain	---	---
72	3208 Mitchell	Hall	---	---
73	3212 Mitchell	Tovey	72	52-72
74	3216 Mitchell	Allison	---	---
75	104 Reed	J. Creach	70	22-70

--- Denotes information not found. Inventory is based on DNRC records and field investigation.

APPENDIX 1: HELENA LANDFILL AREA WELL INVENTORY

76	Trailer Court on Reed	---	---	---
77	115 Reed	---	---	---
78	120 Reed	W. Cole	50	42-50
79	SW Corner Grn Mdw/Reed	---	---	---
80	3280 Green Meadow	Trails West	---	---
81	3300 Green Meadow	G. M. Market	---	---
82	County Fairgrounds	Fairgrounds	---	---
83	610 W. Custer	AAA Car Wash	---	---
84	500 Cole Ave.	---	---	---
85	210 Harwood	Ralston	75	15-75
86	15 Reed	C. Bryant	72	---
HL-90-1	---	City of Helena	60	40-60
HL-90-2	---	City of Helena	68	60-68
HL-90-3	---	City of Helena	79	59-79
83-6	---	City of Helena	25	19-23
83-7	---	City of Helena	40	32-37
82-1	---	City of Helena	40	14-34
82-2	---	City of Helena	43	23-43
82-3	---	City of Helena	83	43-83
82-4	---	City of Helena	79	44-74
HL-1	---	EPA	---	---
HL-2	---	EPA	---	---
HL-5	---	EPA	---	---
HL-6	---	EPA	---	---
HL-7	---	EPA	---	---
EPA1	---	EPA	54.5	39.5-54.5
EPA2	---	EPA	55.1	40.1-55.1
EPA3	---	EPA	95	85-95
EPA4	---	EPA	76.2	66.2-76.2
I-1	---	Golf Course	146	35-95
I-2	---	Golf Course	---	---
I-3	---	Golf Course	220	71-170 (Zones)
I-4	---	Batch Fields	156	60-156
I-5	---	Carroll College	550	100-550
I-6	---	Carroll College	320	100-320
I-7	---	Golf Course	---	---

--- Denotes information not found. Inventory is based on DNRC records and field investigation.

RECEIVED

AUG 26 1992

MONTANA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL SCIENCES
SOLID AND HAZARDOUS WASTE DIVISION

Solid & Hazardous Waste Bureau
Superfund

To: Don Vidrine (RCRA), Jon Dillard (SW), Carol Fox (CECRA),
Karen Zackheim (CERCLA), Jeff Kuhn (LUST), and John
Arrigo (WQB)

From: Denise Martin *Denise Martin*

Date: August 25, 1992

Subject: EPA's Proposed Abandonment of Monitoring Wells

EPA's Field Investigation Team (FIT) contract ended October 1991. During FIT's investigation of various Montana sites, several monitoring wells were installed. Now that the contract has ended, EPA is recommending that the wells be abandoned or well responsibility be transferred to state agencies/property owners/potentially responsible parties (PRP).

Attached is a list of FIT monitoring well sites. Please review the list and determine if any of the monitoring wells would be useful to your program. By **11 September 1992**, please provide me with the following information for monitoring wells your program determines as useful: 1) site name, 2) program enforcement/activities at the site, 3) well i.d. numbers, and 4) preferred responsibility (e.g. State/PRP/etc.).

If you have any questions, please call me at 449-4067. Thank you!

RECEIVED

AUG 2 1992

MONTANA DEPARTMENT OF
HEALTH AND ENVIRONMENT
1010 AND HALL ST. BUTTE, MT 59717

Solid & Hazardous Waste Bureau
Butte

Don Vining (RWA), Jon Di/Land (SW), and Tom (CENRA),
Katie Jackson (CENRA), Jeff Kohn (RWA), and John
Arrigo (WOB)

John Vining

Date: August 25, 1992

Subject: EPA's Proposed Abandonment of Monitoring Wells

EPA's Field Investigation Team (FIT) contract ended October 1991. During FIT's investigation at various Montana sites, several monitoring wells were installed. Now that the contract has ended, EPA is recommending that the wells be abandoned or well responsibility be transferred to state agencies, property owners/potentially responsible parties (PRPs).

Attached is a list of FIT monitoring well sites. Please review the list and determine if any of the monitoring wells would be useful to your program. By September 1992, please provide us with the following information for monitoring wells your program determines as useful: 1) site name, 2) program enforcement activities at the site, 3) well I.D. number, and 4) preferred responsibility (e.g., owner/PRP).

If you have any questions, please call me at 462-4067. Thank you!

INVENTORY OF REGION VIII EPA WELLS
INSTALLED BY THE PIT AND ITS SUBCONTRACTORS
IN THE STATE OF MONTANA 1980-1991

TDD #F08-9101-06/PAN #F08Z127VAA

SITE NAME/ SITE ASSESSMENT OR ENFORCEMENT	LOCATION	# OF WELLS	WELL I.D. NO.	TOTAL DEPTH (FT)	ELEV. (FT) *	DATE DRILLED	PERMITTED	WELL OWNERSHIP	ACTION STATUS	RECOMMENDED ACTION **
Mouat Industries/ SITE ASSESSMENT	Columbus	2	DG-MW-1 DG-MW-2	22.0 20.0	UNKNOWN UNKNOWN	7/84 7/84	NO NO	EPA EPA	ACTIVE ACTIVE	P/A P/A
Comet Oil/ SITE ASSESSMENT	Billings	2	CO-MW-1 CO-MW-2	45.5 46.5	UNKNOWN UNKNOWN	7/84 7/84	NO NO	EPA EPA	ACTIVE ACTIVE	P/A P/A
Falls Chemical/ SITE ASSESSMENT	Great Falls	2	FC-DH-1 FC-DH-2	15.0 16.5	UNKNOWN UNKNOWN	7/84 8/84	NO NO	EPA EPA	ACTIVE ACTIVE	P/A P/A
Pacific Power and Light/ SITE ASSESSMENT	Libby	2	PPL-MW-E-1 PPL-MW-E-2	46.0 32.0	2134 GL 2134 GL	8/84 8/84	NO NO	EPA EPA	ACTIVE ACTIVE	P/A P/A
Note: These two wells are a nested pair.										
Diamond Asphalt Company/ SITE ASSESSMENT	Chinook	6	DA-GW-1 DA-GW-2 DA-GW-3 DA-GW-4 DA-GW-5 DA-GW-6	18.5 18.7 22.0 18.0 18.0 22.0	UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN UNKNOWN	7/85 7/85 7/85 7/85 7/85 7/85	NO NO NO NO NO NO	EPA EPA EPA EPA EPA EPA	ACTIVE ACTIVE ACTIVE ACTIVE ACTIVE ACTIVE	P/A P/A P/A P/A P/A P/A
Reliance Refinery/ SITE ASSESSMENT	Kalispell	3	RR-MW-1 RR-MW-2 RR-MW-3	24.0 25.0 20.0	2925.67 MP 2925.15 MP 2928.82 MP	2/86 2/86 2/86	NO NO NO	EPA EPA EPA	ACTIVE ACTIVE ACTIVE	P/A P/A P/A
Mission Wye/ SITE ASSESSMENT	Livingston	3	MW-MW-1A MW-MW-2 MW-MW-3	25.0 21.0 25.0	4414.18 GL 4405.25 GL 4409.59 GL	6/86 6/86 6/86	NO NO NO	EPA EPA EPA	ACTIVE ACTIVE ACTIVE	P/A P/A P/A
Hart Oil Refinery/ SITE ASSESSMENT	Missoula	4	HR-MW-1 HR-MW-2 HR-MW-3 HR-MW-4	40.5 42.0 40.0 39.0	3146.88 GL 3146.27 GL 3146.13 GL 3146.25 GL	6/86 6/86 6/86 6/86	NO NO NO NO	EPA EPA EPA EPA	ACTIVE ACTIVE ACTIVE ACTIVE	P/A P/A P/A P/A

NOTE: * -- GL -- Elevation measured at ground level.

MP -- Elevation measured at a specific measuring point on the well casing (usually at a notch or the low point in the top of the well casing).

** -- P/A-- File for permit or abandon.

INVENTORY OF REGION VIII EPA WELLS
INSTALLED BY THE PIT AND ITS SUBCONTRACTORS
IN THE STATE OF MONTANA 1980-1991

TDD #F08-9101-06/PAN #F082127VAA

SITE NAME/ SITE ASSESSMENT OR ENFORCEMENT	LOCATION	# OF WELLS	WELL I.D. NO.	TOTAL DEPTH (FT)	ELEV. (FT) *	DATE DRILLED	PERMITTED	WELL OWNERSHIP	ACTION STATUS	RECOMMENDED ACTION **
Creston Post and Pole Yard/ SITE ASSESSMENT	Creston	3	CP-MW-1	19.0	UNKNOWN	6/87	NO	EPA	ACTIVE	P/A
			CP-MW-2	19.0	UNKNOWN	6/87	NO	EPA	ACTIVE	P/A
			CP-MW-3	19.0	UNKNOWN	6/87	NO	EPA	ACTIVE	P/A
Beaver Wood Products/ SITE ASSESSMENT	Columbia Falls	2	BW-MW-1	72.0	UNKNOWN	6/87	NO	EPA	ACTIVE	P/A
			BW-MW-2	78.0	UNKNOWN	6/87	NO	EPA	ACTIVE	P/A
Helena Landfill/ SITE ASSESSMENT	Helena	4	HL-MW-1A	59.0	3986 GL	9/87	NO	EPA	ACTIVE	P/A
			HL-MW-2A	60.0	3980 GL	9/87	NO	EPA	ACTIVE	P/A
			HL-MW-3B	95.0	UNKNOWN	1/89	NO	EPA	ACTIVE	P/A
			HL-MW-4B	76.0	UNKNOWN	1/89	NO	EPA	ACTIVE	P/A
Columbia Falls Aluminum Company/ SITE ASSESSMENT	Columbia Falls	2	CF-MW-1	155.0	3168.36 MP	6/88	NO	EPA	ACTIVE	P/A
			CF-MW-2	51.0	3104.13 MP	6/88	NO	EPA	ACTIVE	P/A
Stauffer Chemical Company/ SITE ASSESSMENT	Silver Bow	3	SCC-MW-1	45.2	UNKNOWN	8/88	NO	EPA	ACTIVE	P/A
			SCC-MW-3	31.5	UNKNOWN	8/88	NO	EPA	ACTIVE	P/A
			SCC-MW-4	49.0	UNKNOWN	8/88	NO	EPA	ACTIVE	P/A

NOTE: * -- GL -- Elevation measured at ground level.

MP -- Elevation measured at a specific measuring point on the well casing (usually at a notch or the low point in the top of the well casing).

** -- P/A-- File for permit or abandon.

CLOSED
CITY OF HELENA LANDFILL
LICENSE NUMBER 90

HYDROMETRICS

**1992 ANNUAL REPORT ON GROUNDWATER
AND METHANE MONITORING**

AUGUST 1992

**IS LOCATED IN THE GROUNDWATER
MONITORING REPORTS ARCHIVE,
BOX NUMBER 3**

RECEIVED 8/13/1992

Pat -

these results are from
Sun Gardens Trailer Court
which is down-gradient
of the Helena City landfill
& as per Vivian
Drake could possibly
be affected by the
city storm H₂O run-off

Sue Schultz
WQB
Drinking H₂O

City of Helena
grdwtr

RECEIVED

JUN 11 1992

MONTANA DEPARTMENT OF
AND ENVIRONMENTAL
SOLID AND HAZARDOUS WASTE

MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES
CHEMISTRY LABORATORY BUREAU
VOLATILE ANALYSIS REPORT

LABORATORY NUMBER: 2118731101

SAMPLE DESCRIPTION / SAMPLER / DATE SAMPLED

SUN GARDEN TR PK HELENA UDC / UD / 5-12-92

MATRIX / EXTRACTION METHOD / DATE EXTRACTED

WATER/524.2/05-26-92

ANALYSIS METHOD

DATE ANALYZED

EPA 524.2

920528 14:57

COMPOUNDS DETECTED

COMPOUND NUMBER	COMPOUND NAME	RETENTION TIME	PEAK AREA	CONCENTRATION ug/L
2	DICHLOROCHLOROMETHANE	2.783	28032	2.5
7	TRICHLOROFLUOROMETHANE	4.604	15854	1.0
13	CHLOROFORM	10.104	86874	5.7
16	1,1,1-TRICHLOROETHANE	10.476	11560	7
29	TETRACHLOROETHENE	16.640	30536	2.4
1	FLUOROBENZENE	11.865	75659	5.0

* denotes internal standards

SURRI GATE COMPOUNDS

COMPOUND NUMBER	COMPOUND NAME	CONCENTRATION ug/L	PERCENT RECOVERY
41	4-BROMOFLUOROBENZENE	4.6	92
55	1,2-DICHLOROBENZENE-D4	4.6	92

COMPOUNDS ANALYSED USING EPA METHOD 524.2
PRACTICAL QUANTITATION LIMITS ARE AS MICROGRAMS PER LITER

2. DICHLOROCHLOROMETHANE	< .5	31. DIBROMOCHLOROMETHANE	< .5
3. CHLOROMETHANE	< .5	32. 1,2-DIBROMOMETHANE	< .5
4. VINYL CHLORIDE	< .5	33. CHLOROPENZENE	< .5
5. BROMOMETHANE	< .5	34. 1,1,1,2-TETRACHLOROETHANE	< .5
6. CHLOROETHANE	< .5	35. ETHYLBENZENE	< .5
7. TRICHLOROFLUOROMETHANE	< .5	36. M+P-XYLENE	< .5
8. 1,1-DICHLOROETHENE	< .5	37. O-XYLENE	< .5
9. METHYLENE CHLORIDE	< .5	38. STYRENE	< .5
10. TRANS-1,2-DICHLOROETHENE	< .5	39. BROMOFORM	< .5
11. 1,1-DICHLOROETHANE	< .5	40. ISOPROPYLBENZENE	< .5
12. 2,2-DICHLOROPROPANE	< .5	42. BROMOBENZENE	< .5
13. CIS-1,2-DICHLOROETHENE	< .5	43. 1,2,3-TRICHLOROPROPANE	< .5
14. BROMOCHLOROMETHANE	< .5	44. 1,1,2,2-TETRACHLOROETHANE	< .5
15. CHLOROFORM	< .5	45. N-PROPYLBENZENE	< .5
16. 1,1,1-TRICHLOROETHANE	< .5	46. 2-CHLOROTOLUENE	< .5
17. CARBON TETRACHLORIDE	< .5	47. 4-CHLOROTOLUENE	< .5
18. 1,1-DICHLOROPROPENE	< .5	48. 1,3,5-TRIMETHYLBENZENE	< .5

20. 1,1-DICHLOROETHANE	<.5	50. 1,2,4-TRIMETHYLBENZENE	<.5
21. TRICHLOROETHENE	<.5	51. SEC-BUTYLBENZENE	<.5
22. 1,2-DICHLOROPROPANE	<.5	52. 1,3-DICHLOROBENZENE	<.5
23. DIBROMOMETHANE	<.5	53. 1,4-DICHLOROBENZENE	<.5
24. BROMODICHLOROMETHANE	<.5	54. 4-ISOPROPYLTOLUENE	<.5
25. CIS-1,3-DICHLOROPROPENE	<.5	55. 1,2-DICHLOROBENZENE	<.5
26. TOLUENE	<.5	57. N-BUTYLBENZENE	<.5
27. TRANS-1,3-DICHLOROPROPENE	<.5	58. 1,2-DIBROMO-3-CHLOROPROPANE	<.5
28. 1,1,2-TRICHLOROETHANE	<.5	59. 1,2,4-TRICHLOROBENZENE	<.5
29. TETRACHLOROETHENE	<.5	60. NAPHTHALENE	<.5
30. 1,3-DICHLOROPROPANE	<.5	61. HEXACHLOROBUTADIENE	<.5
		62. 1,2,3-TRICHLOROBENZENE	<.5

*To determine the practical quantitation limits in this sample multiply the above value by 1.00000. The units of value will either be in ug/L or ug/g (wet weight) depending on the nature of the sample.

COMMENTS ON SAMPLE NUMBER >1167X+D1

ANALYST Dennis Braun DATE 5/29/92

File: Lewis & Clark Co
City of Helena
gduhr.

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES
Solid and Hazardous Waste Bureau
Solid Waste Program
(406) 444-1430

STAN STEPHENS, GOVERNOR

FAX #(406) 444-1499



STATE OF MONTANA

OFFICE 836 Front Street
LOCATION: Helena, Montana

MAILING Cogswell Building
ADDRESS: Helena, MT 59620

December 2, 1992

Dick Nesbit
City of Helena
316 North Park
Helena, Montana 59623

RE: CITY OF HELENA LANDFILL, LEWIS AND CLARK COUNTY -
GROUNDWATER MONITORING WELL KEYS.

Dear Mr. Nesbit:

It has come to my attention that the Department of Health and Environmental Sciences Solid Waste Program (the Department) has been keeping the groundwater monitoring well keys for this site. The Department believes that it would be better for the owner/operator of the landfill to keep these keys in a secure location. At the owner/operator's discretion, he may wish to furnish the contractor in charge of conducting the sampling events with a set of keys to the monitoring wells.

The Department would like to take this opportunity to return the set of eight (8) groundwater monitoring well keys to the City of Helena for their safe keeping.

Sincerely,

A handwritten signature in cursive script, appearing to read "Pat Potts".

Pat Potts
Environmental Specialist

I have received the above described keys from Pat Potts on
12/2/92,

Richard A. Nesbit / My Janet Pallister
Dick Nesbit, City of Helena

cc: Steve Downs, Geological Engineer, Hydrometrics, Inc., 2727
Airport Road, Helena, MT 59601

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES
Solid Waste Program
(406) 444-1433

STATE OF MONTANA



Lewis and Clark

ROUTE SLIP

DEPARTMENT OF HEALTH & ENVIRONMENTAL SCIENCES

TO: *Proof* DATE: *8/31/92*

1. *Jim W. Sw / Pat C FRL*
2. *Jon D. JD*
3. *Roger / Duane* *per* *Dr*

- | | | |
|--|---|---|
| ☒ Approval | ☐ Comment | ☐ Necessary Action |
| ☐ Note and Return | ☐ Note and File | ☐ Investigate |
| ☐ Prepare reply | ☐ Signature | ☐ See Me |
| ☐ As requested | ☐ For your information | ☐ Per Conversation |

REMARKS:

Review.
sw/helena.ann

FROM: *P* ³

*mailed
8-9-92
en*

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES

Solid and Hazardous Waste Bureau
Solid Waste Program

STAN STEPHENS, GOVERNOR (406) 444-1430

FAX #(406) 444-1499



STATE OF MONTANA

OFFICE 836 Front Street
LOCATION: Helena, Montana

MAILING Cogswell Building
ADDRESS: Helena, MT 59620

September 9, 1992

Mr. Dick Nisbet
City of Helena
316 North Park
Helena, Montana 59623

RE: REVIEW AND NOTICE OF DEFICIENCIES (NOD) - "HELENA
LANDFILL 1992 ANNUAL REPORT ON GROUNDWATER AND
METHANE MONITORING".

Dear Mr. Nisbet:

The Montana Department of Health and Environmental Sciences Solid Waste Program (the Department) received the above referenced report on August 13, 1992. Upon review of this report by the Department, the following deficiencies were found:

1) Page 5.

In the Annual Report, it is stated that wells are purged with a decontaminated truck mounted bailer or disposal hand-bailer. Explain why a submersible pump was used to purge and take all but VOA samples during the May, 1992 sampling event at well 83-6. Does this procedure need to be revised in the text to exemplify actual field operations?

Please provide the order in which the wells are sampled. Provide the order in which the samples are collected from each well.

2) Page 7.

In the analysis of the plume described in this document as:

"the plume of organic constituents" that "has not significantly changed";

a plume map of only dichlorodifluoromethane was presented. Explain how the area and concentrations of this plume compare with the plumes associated with the other organic constituents associated with the impacted groundwater in the area of the site. Provide additional constituent isopach maps to depict the

DEPARTMENT OF
HEALTH AND HUMAN SERVICES

Public Health Service
U.S. Department of Health and Human Services



STATE OF MONTANA

OFFICE OF THE
ATTORNEY GENERAL
STATE OF MONTANA

September 9, 1962

Mr. J. Lee
101 N. 1st
Butte, Montana

Dear Mr. Lee:

Reference is made to your letter of August 28, 1962, regarding the proposed amendment to the Montana Constitution which would change the method of electing judges of the Montana Supreme Court.

The proposed amendment would change the method of electing judges of the Montana Supreme Court from the present method of election by the people to election by the legislature. This proposed change is being considered by the Montana State Bar Association and the Montana Judicial Conference.

In the former method, a judge of the Montana Supreme Court is elected by the people for a term of six years. The proposed amendment would change the method of election to election by the legislature for a term of six years. This proposed change is being considered by the Montana State Bar Association and the Montana Judicial Conference.

I am sure that you are aware of the fact that the proposed amendment is being considered by the Montana State Bar Association and the Montana Judicial Conference.

Sincerely,
[Signature]

The proposed amendment to the Montana Constitution which would change the method of electing judges of the Montana Supreme Court is being considered by the Montana State Bar Association and the Montana Judicial Conference.

areal extent of contamination and the constituent concentrations, or if no changes have been observed, equilibrium conditions.

3) Table 3.1 "Typical Uses and Properties of Those Organic Compounds Detected in Groundwater".

Please identify the degradation products associated with the organic compounds listed in this table.

4) Table 3.2 "Volatile Organic Compound Levels in Private Wells Near Helena Landfill".

Provide a table giving the highest concentrations of any contaminant constituents found in the monitoring wells.

5) Page 10.

Identify the wells that are across gradient or upgradient to the west of the landfill that have exhibited detectable amounts of trichloroethene and chloroform. How have the concentrations of these constituents changed through the period of time that the landfill has been monitoring groundwater?

6) Page 11, Methane Monitoring.

a) Please provide details, such as a manufacturer's brochure, or the portion of the instrument operations manual discussing the use of the "inject" mode on the OVA for measuring a "direct methane concentration reading".

(b) Why isn't the Gastech Environmental Monitors Tank-Techtor instrument being used for methane monitoring, as Hydrometrics had proposed in their letter to the Department dated June 26, 1991?

(c) On June 4, 1991 the City of Helena's Fire Department detected 100% LELs in two of the landfill monitoring wells (i.e. 82-3 and 83-7). Why isn't well 83-7 presently being monitored for methane gas?

(d) After removing the well cap and covering the open wellhead with aluminum foil, how long did you wait to allow stabilization of the gases to occur in the well casing. Because methane is a naturally occurring, heavier than air gas, what type of well-evacuation method was used to sample gases from the bottom portion of the casing.

(e) Discuss the procedures and equipment used in the collection of methane samples for laboratory analysis.

(f) Provide the numerical equivalent(s) for "background levels" in reference to methane monitoring associated with this methodology and technology.

and extent of contamination and the ecological consequences of it to
man and his environment.

2) Table 11 Typical Data and Properties of These Organic Compounds listed in
"Guidelines".
Please identify the following problems associated with the organic compounds
listed in this table.

3) Table 12 Typical Organic Compound Levels in Various Media from Various
Locations.
Provide a table listing the highest concentrations of any compound
mentioned in the accompanying table.

4) Page 10

Identify the well that has shown greatest or significant increase in the
level of the following chemical elements of inorganic and organic
compounds. How has the concentration of these elements changed
through the period of time that the wells have been monitoring groundwater?

5) Page 11, Table 13, Summary

a) Table 13, Summary. Identify each of the compounds listed in the table of
chemical elements and organic compounds listed in the table. Indicate in the
table the monitoring system used for each compound.

b) Why did the Chemical Environmental Monitoring Task Force determine
that the following monitoring system is the best for the purpose of
monitoring the following compounds in the table? (Table 13, Summary)

c) The time to test the level of the following compounds is listed in
Table 13, Summary. Why is the following table (Table 13, Summary) listed
in two of the following wells (Table 13, Summary)? Why has
well 10-1 been selected for monitoring the following compounds?

d) After removing the well cap and covering the well with a
plastic bag, how long will it take to fill the well with water? How
long will it take to fill the well with water? How long will it take
to fill the well with water? How long will it take to fill the well
with water? How long will it take to fill the well with water?

e) Discuss the problems and equipment used in the collection of water
samples for laboratory analysis.

f) Provide the chemical equations for the following reactions in which
the following chemical elements and organic compounds are involved.

(g) Provide the conversion factor(s) for parts-per-million (ppm) methane, to percent lower explosive limits (LELs).

(h) Note that methane monitoring from groundwater monitoring wells is not an acceptable procedure for accurate methane gas measurement. Therefore, it is important that the City of Helena be cognizant of the fact that an approved methane monitoring system is presently required at this facility, and will be required at all Class II landfills as of October, 1993 [see 40 CFR 258.23(a)].

7) **Table 4.1 "1992 Methane Monitoring at the Helena Landfill".**

a) With the continually elevated methane concentrations measured at groundwater monitoring well 82-3, additional methane monitoring points such as I-6 would be helpful in possibly delineating and tracking the extent of the existing methane plume. Is it mechanically possible to monitor headspace for methane gas at well I-6?

b) Please provide a map to depict the areas of high methane gas concentrations.

8) **Page 14 - Conclusions**

a) Although this report states that:

"no significant changes from the previous monitoring event in groundwater flow directions or water quality has occurred",

(i) Describe what is a "significant" change.

(ii) Are there any seasonal changes, either potentiometric or constituent concentrations, that can be noted over the previous years of groundwater monitoring history.

b) Explain how "equilibrium conditions" can be reached, if the landfill is still actively taking wastes and no remedial measures have been initiated.

9) **Figure 1 - Potentiometric Map**

a) Provide the water level elevations on the map at the data points measured.

b) Is the infiltration gallery part of the landfill groundwater system? Explain the purpose and use of this gallery.

c) Why are there two locations on this map for abandoned monitoring well HL-4?

d) Please correct the **Township** on the base map for both Figures 1 & 2.

(c) Provide the construction details for parts per million (ppm) method in
current laws, existing limits (1.127).

(d) Note that methane monitoring does provide a means of monitoring wells is not an
adequate measure for accurate methane gas measurement. Therefore it is
important that the City of Houston be cognizant of the fact that an approved
methane monitoring system is presently required in the drilling and will be
required at all Class II wells as of October, 1965 (see 40 CFR 156.12(a)).

7) Table 1.1 1962 Methane Monitoring at the Houston Landfill.

a) With the extremely elevated methane concentrations measured at
Houston not monitoring with 21-2 additional methane monitoring points such as
it would be helpful in possibly detecting and measuring the extent of the
existing methane plume. It is recommended that to monitor methane gas
methane gas at well 1-17.

b) Please provide a map to depict the extent of high methane gas
concentrations.

8) Table 1.2 - Conclusion.

a) Although the report states that

"no significant changes from the previous monitoring event in
groundwater flow direction or water quality has occurred,"

(i) Describe what is a "significant" change.

(ii) Are there any seasonal changes, either groundwater or methane
concentrations, that can be noted from the previous years of groundwater
monitoring history?

It explains how "significant conditions" can be tested, if the landfill is still
having some water and no remedial measures have been initiated.

9) Figure 1 - Total methane map.

a) Provide the water level elevation on the map at the first point measured.

b) Is the methane gas flow rate of the landfill groundwater system? Explain
the purpose and use of the figure.

c) Why are there two locations on the map for abandoned monitoring wells?

d) Please correct the Township on the base map for both Figures 1 & 2.

September 9, 1992

Page 4

10) **Appendix 1 - "Helena landfill Area Well Inventory"**

Where is monitoring well 83-6 on this inventory?

11) **Appendix 2 - "Laboratory Analytical Reports"**

a) Please provide a "Sample Code List" for the 5-92 analytical data, as you have for the 1-92 data.

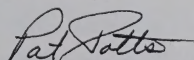
b) Why were numbers HL-9205-104, 111, 120, and 121 omitted in the sample collection numbering system?

c) Provide copies of the chain of custody (COC) forms.

In an effort to become more familiar with the existing data on this site, I have briefly reviewed the "Helena Landfill Closure" and the "Hydrogeologic Investigation of the City of Helena Landfill" documents. The above comments, questions and deficiencies still remain unanswered at this time.

These items need to be addressed in writing to the Department within 90 calendar days from the date of this letter. If you have any questions, please give me a call.

Sincerely,



Pat Potts
Environmental Specialist

cc: Steve Downs, Geological Engineer, Hydrometrics, Inc., 2727 Airport Road,
Helena, MT 59601

file: sw\helena.ann

Lewis & Clark

ROUTE SLIP

DEPARTMENT OF HEALTH & ENVIRONMENTAL SCIENCES

TO: Proof, please lt

DATE: 8/27/92

1. Pat C PPK Jim W JW

2. Jon D JD

3. Roger Duane glt rcs

☒ Approval

☐ Comment

☐ Necessary Action

☐ Note and Return

☐ Note and File

☐ Investigate

☐ Prepare reply

☐ Signature

☐ See Me

☐ As requested

☐ For your information

☐ Per Conversation

REMARKS:

hama:
(see enclosures for copies)

attach { ted - both
attach.
Steve - none

FROM: p3

file

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES

Solid and Hazardous Waste Bureau
Solid Waste Program

STAN STEPHENS, GOVERNOR (406) 444-1430

FAX #(406) 444-1499



STATE OF MONTANA

OFFICE 836 Front Street
LOCATION: Helena, Montana

MAILING Cogswell Building
ADDRESS: Helena, MT 59620

August 31, 1992

Ms. Denise Martin
Montana Department of Health and Environmental Sciences - Superfund
Steamboat Block
Helena, Montana 59620

RE: EPA'S PROPOSED ABANDONMENT OF MONITORING WELLS
ASSOCIATED WITH THE HELENA LANDFILL/SITE ASSESSMENT.

Dear Ms. Martin:

This letter is in response to the memo I received from you dated August 25, 1992 concerning the abandonment of the following four monitoring wells associated with the Helena Landfill/Site Assessment:

HL-MW-1A,
HL-MW-2A,
HL-MW-3B and
HL-MW-4B.

These wells are presently being monitored on a semi-annual basis by the City of Helena as an integral part of their groundwater monitoring network. The Montana Department of Health and Sciences Solid Waste Program (the Program) recognizes the value of these monitoring wells and strongly recommends that the City of Helena accept future responsibility for the four U.S. EPA monitoring wells identified above.

Upon contacting Mr. Ted Hill (City Engineer) with the City of Helena, concerning the issue of retaining the above groundwater monitoring wells, he agreed with the importance of these wells in the City's present monitoring network at the active landfill facility. Mr. Hill assured me that the City of Helena would assume the responsibility for these wells from the U.S. EPA. Mr. Hill is also aware that the City would be responsible for proper plugging and abandonment procedures that would be required in the event that the landfill no longer needs to monitor these wells.

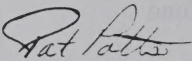
August 31, 1992

Page 2

Enclosed are copies of the well completions that the Program has on these wells in their files at this time. Because there has been some alteration in well numbering, please review this information to confirm that the wells you reference in your memo are in fact these same wells. If the U.S. EPA or Superfund has any further documentation on the wells (i.e. lithologic descriptions/boring logs), it should be forwarded to the City for their files, as well as copies of this data sent to the Solid Waste Program.

If you have any questions please give me a call.

Sincerely,



Pat Potts
Environmental Specialist

enclosures

U.S.EPA Memo (Mr. Ted Hill - City of Helena)
Well Completion Data

cc: Mr. Ted Hill, City of Helena, 316 North Park, Helena, MT 59623

Steve Downs, Geological Engineer, Hydrometrics, Inc. 2727 Airport Road,
Helena, MT 59601

file: sw\helena.epa